Available online at www.sciencedirect.com

ScienceDirect

Journal of Materiomics 1 (2015) iv–vi

www.ceramsoc.com/en/

www.journals.elsevier.com/journal-of-materiomics/

Journal of Materiomics Vol 1, 2015

Graphical Abstracts

Journal of Materiomics **2015**, 1, **1–2**

Preface

Ruiping Yu

Editorial department of Journal of Materiomics, The Chinese Ceramic Society, China

Review Articles

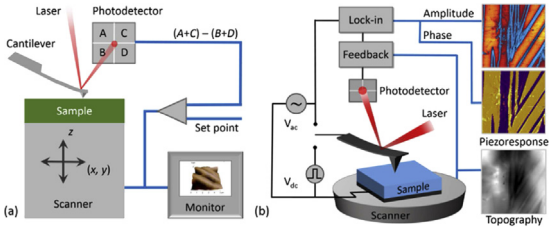
Journal of Materiomics **2015**, 1, **3–21**

Strain-based scanning probe microscopies for functional materials, biological structures, and electrochemical systems

Jiangyu Li[a,*], Jing-Feng Li[b], Qi Yu[b], Qian Nataly Chen[a], Shuhong Xie[c]

[a]*Department of Mechanical Engineering, University of Washington, Seattle, WA 98195-2600, USA*

We review the fundamentals of strain-based scanning probe microscopy, highlight its applications in functional materials, electrochemical systems, and biological structures, and discuss some of its challenges.



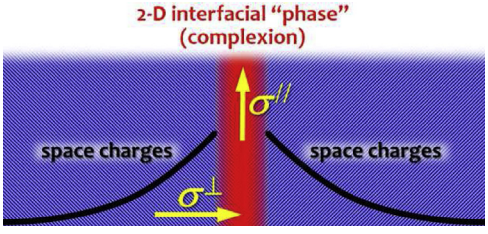
Journal of Materiomics **2015**, 1, **22–32**

Interfacial engineering of solid electrolytes

Jian Luo

Department of NanoEngineering, Program of Materials Science and Engineering, University of California, San Diego, CA 92093-0448, USA

The roles of interfaces in either blocking or enhancing ionic conduction are reviewed, and a potentially-transformative idea of utilizing 2-D interfacial "phases" to tailor solid electrolytes is proposed.



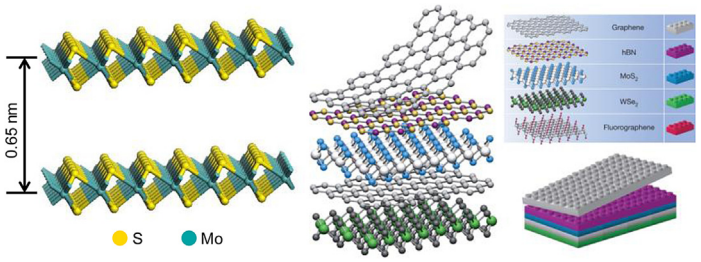
Journal of Materiomics 2015, 1, 33–44

Two-dimensional MoS_2: Properties, preparation, and applications

Xiao Li[a,b], Hongwei Zhu[a,b,*]

[a]School of Materials Science and Engineering, State Key Laboratory of New Ceramics and Fine Processing, Tsinghua University, Beijing 100084, China
[b]Center for Nano and Micro Mechanics (CNMM), Tsinghua University, Beijing 100084, China

We review the recent advances of synthesis approaches, optical and electronic properties, and potential applications of two-dimensional MoS_2



Original Articles

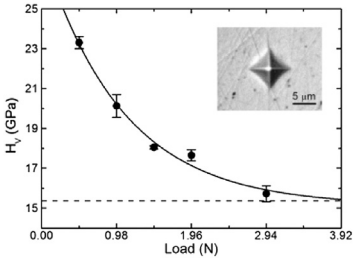
Journal of Materiomics 2015, 1, 45–51

Is orthorhombic iron tetraboride superhard?

Qianqian Wang[a], Julong He[a], Wentao Hu[a], Zhisheng Zhao[b], Chao Zhang[a], Kun Luo[a], Yifei Lü[a], Chunxue Hao[a], Weiming Lü[a], Zhongyuan Liu[a], Dongli Yu[a], Yongjun Tian[a], Bo Xu[a,*]

[a]State Key Laboratory of Metastable Materials Science and Technology, Yanshan University, Qinhuangdao, Hebei 066004, China
[b]Geophysical Laboratory, Carnegie Institution of Washington, Washington, DC 20015, USA

New microhardness measurements on millimeter-sized FeB_4 sample show a low hardness of 15.4 GPa, which excludes FeB_4 as a superhard material.



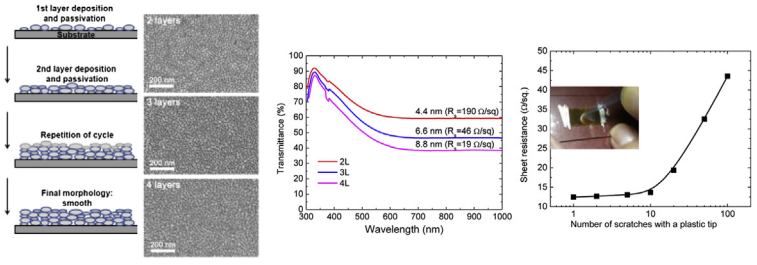
Journal of Materiomics 2015, 1, 52–59

A new method for fabricating ultrathin metal films as scratch-resistant flexible transparent electrodes

Yuan Liu[1], Chuan-Fei Guo[1], Siya Huang, Tianyi Sun, Yumei Wang, Zhifeng Ren[*]

Department of Physics and TcSUH, University of Houston, Houston, TX 77204, USA

We achieved high-quality ultrathin Ag films with good light transmittance, low sheet resistance, and high scratch resistance for flexible electronics.

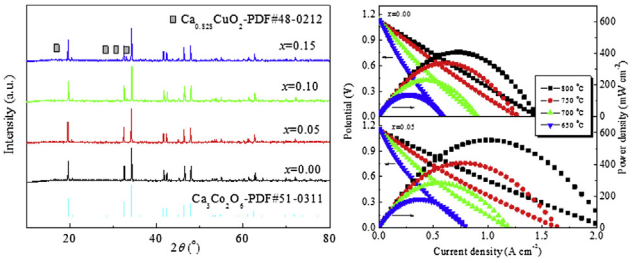


Journal of Materiomics **2015**, 1, **60–67**

Enhanced electrochemical activity in $Ca_3Co_2O_6$ cathode for solid-oxide fuel cells by Cu substitution

Fushao Li[a,b], Rui Zeng[b], Long Jiang[b], Tao Wei[b], Xuefei Lin[a], Yingxian Xu[a], Yunhui Huang[b,*]

[a]*School of Chemistry and Chemical Engineering, Qujing Normal University, Qujing, Yunnan 655011, China*
[b]*School of Materials Science and Engineering, Huazhong University of Science and Technology, Wuhan, Hubei 430074, China*



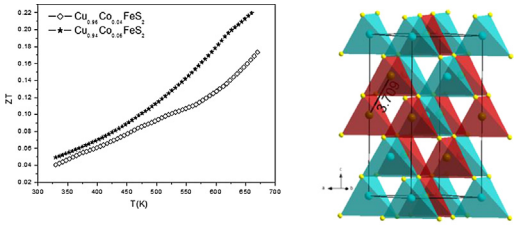
We prepared $Ca_3(Co_{1-x}Cu_x)_2O_6$ powder by sol–gel processing and found that Cu substitution can effectively enhance the electronic and ionic transport properties of $Ca_3Co_2O_6$ cathode for SOFCs.

Journal of Materiomics **2015**, 1, **68–74**

Thermoelectric properties of *n*-type cobalt doped chalcopyrite $Cu_{1-x}Co_xFeS_2$ and *p*-type eskebornite $CuFeSe_2$

D. Berthebaud, O.I. Lebedev, A. Maignan*

Laboratoire CRISMAT, UMR 6508 CNRS/ENSICAEN, 6 bd du Maréchal Juin, F-14050 CAEN Cedex 4, France



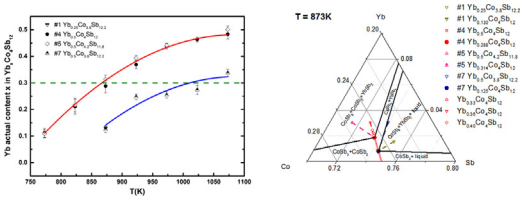
Co- substituted $CuFeS_2$ dense thermoelectric ceramics have been sintered by SPS. A ZT value of 0.22 at 675 K, equivalent to the highest ZT values reported for materials derived from $CuFeS_2$, has been obtained.

Journal of Materiomics **2015**, 1, **75–84**

Temperature dependent solubility of Yb in Yb–$CoSb_3$ skutterudite and its effect on preparation, optimization and lifetime of thermoelectrics

Yinglu Tang[a], Sinn-wen Chen[b], G. Jeffrey Snyder[a,*]

[a]*Department of Applied Physics and Materials Science, California Institute of Technology, Pasadena, CA 91125, USA*
[b]*Department of Chemical Engineering, National Tsing Hua University, #101, Sec.2, Kuang-Fu Rd., Hsin-Chu 300, Taiwan, China*



Skutterudite material with the optimized thermoelectric composition can be produced from a range of nominal compositions with appropriate annealin.